Issues

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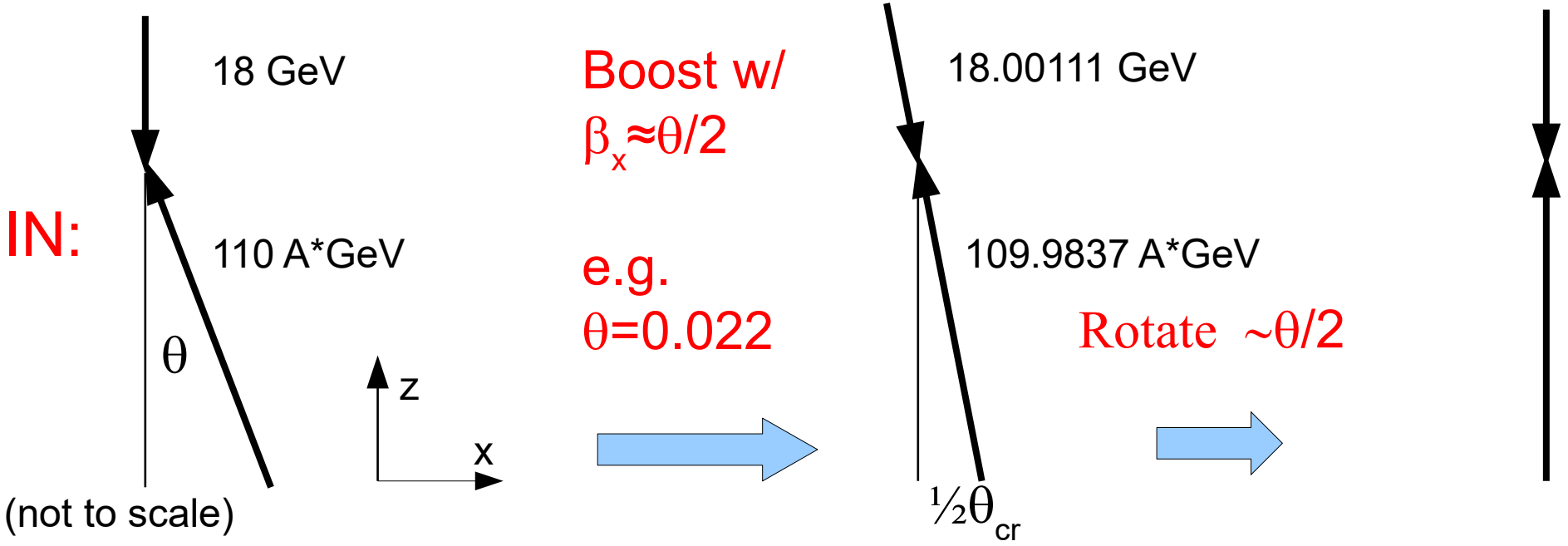
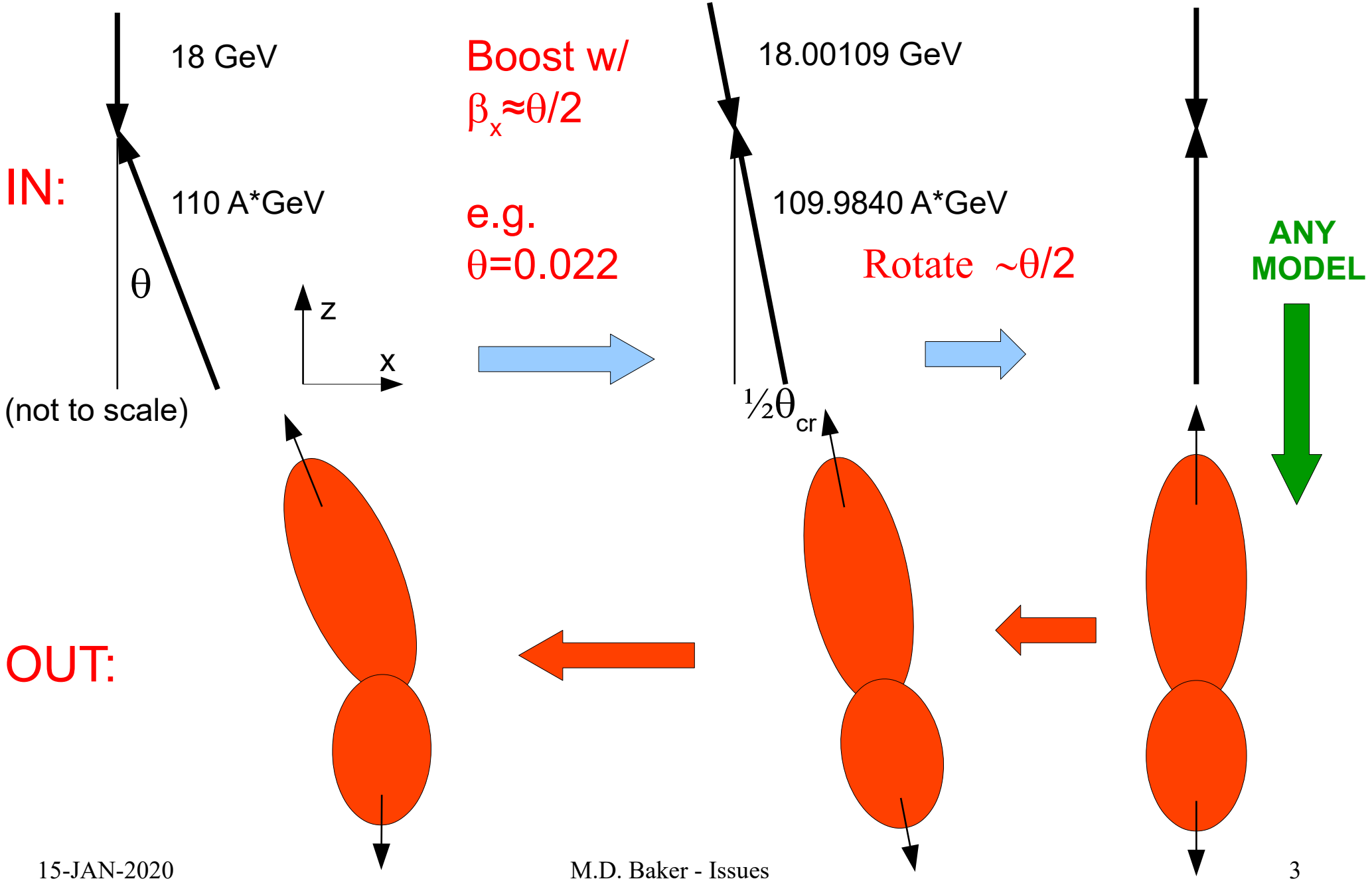
15-DEC-2020

- Crossing Angle
- Angular Divergence
- Low E Pythia

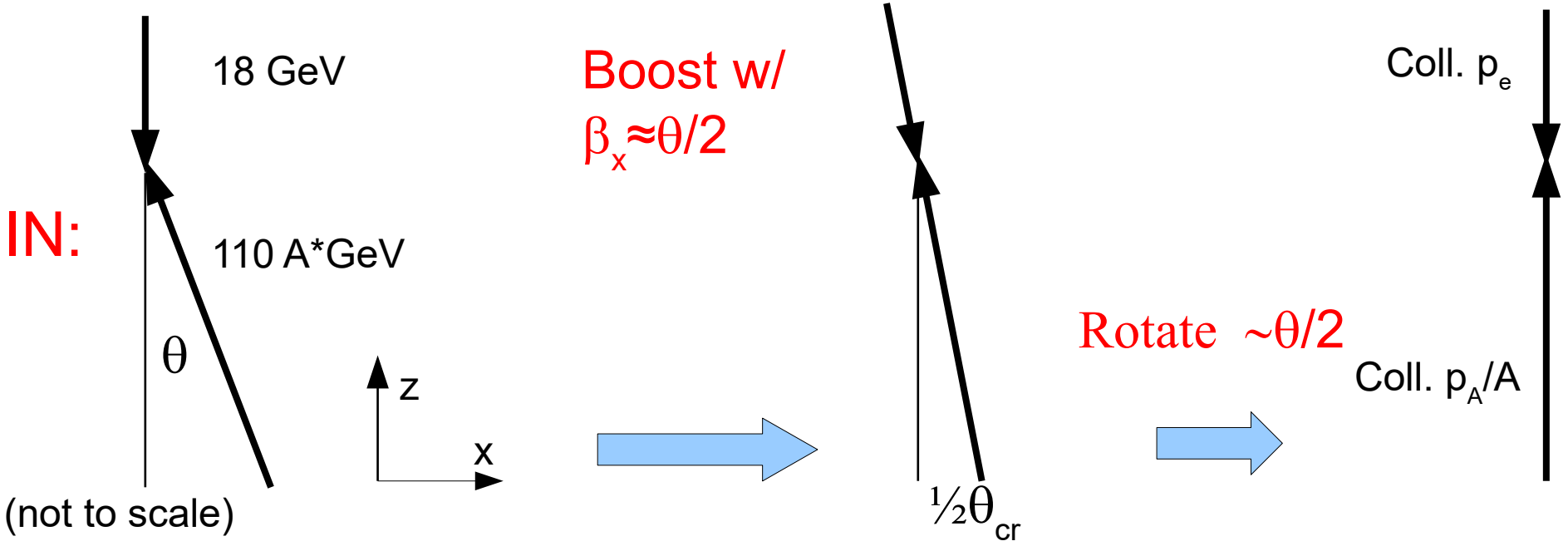
It's all Lorentz transformations ("ROBOS")



It's all Lorentz transformations ("ROBOS")



Angular divergence: e.g. ±1σ in θ_x (A)



θ_{cr}=0.0218 Coll. p_e=18.00107 GeV Coll. p_A/A=109.9844 GeV

θ_{cr}=0.022 Coll. p_e=18.00109 GeV Coll. p_A/A=109.9840 GeV

θ_{cr}=0.0222 Coll. p_e=18.00111 GeV Coll. p_A/A=109.9837 GeV

1ppm variation few ppm variation!

Exact approach

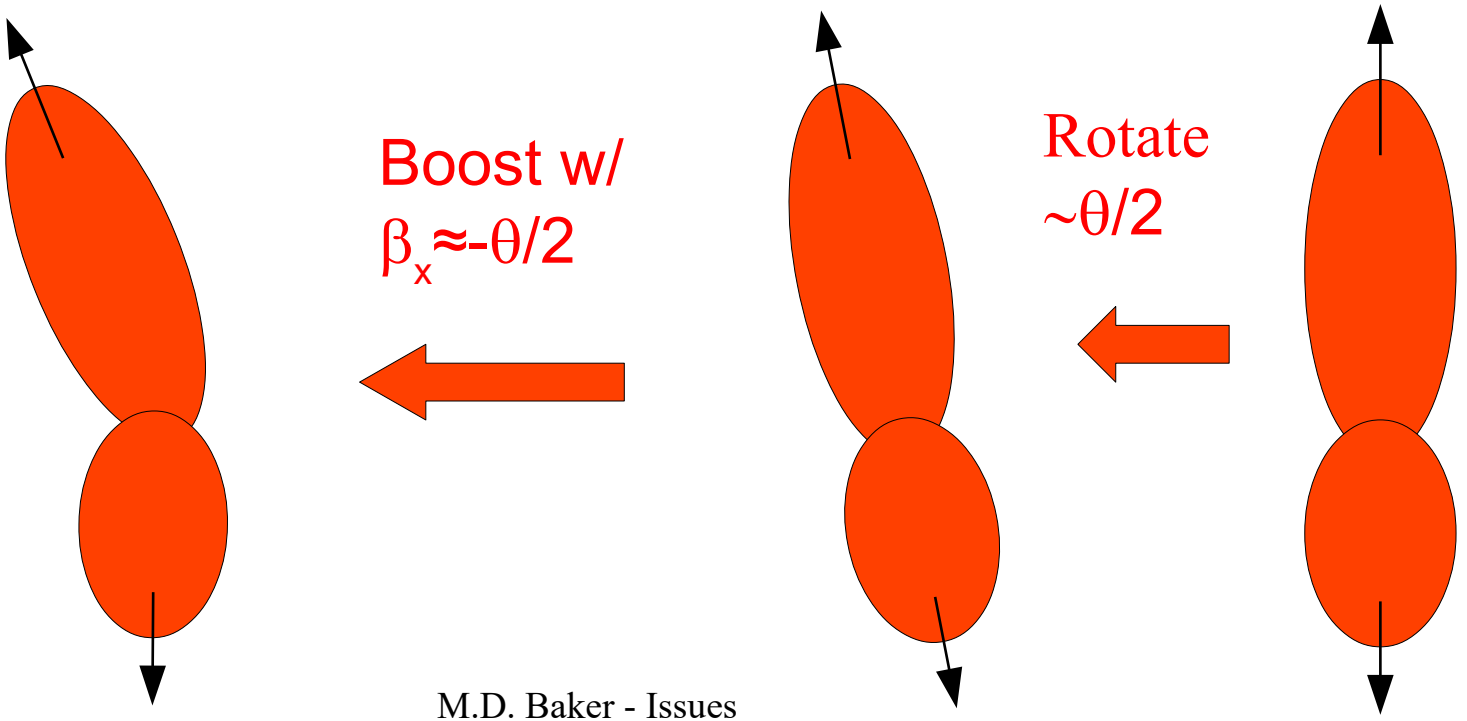
θ=0.0218 Coll. p_e=18.00107 GeV Coll. p_A/A=109.9844 GeV

θ=0.022 Coll. p_e=18.00109 GeV Coll. p_A/A=109.9840 GeV

θ=0.0222 Coll. p_e=18.00111 GeV Coll. p_A/A=109.9837 GeV

1ppm variation few ppm variation!

ANY MODEL



Good approximation – use same p_e & p_A/A

θ=0.0218 Coll. p_e=~~18.00107 GeV~~ Coll. p_A/A=~~109.9844 GeV~~

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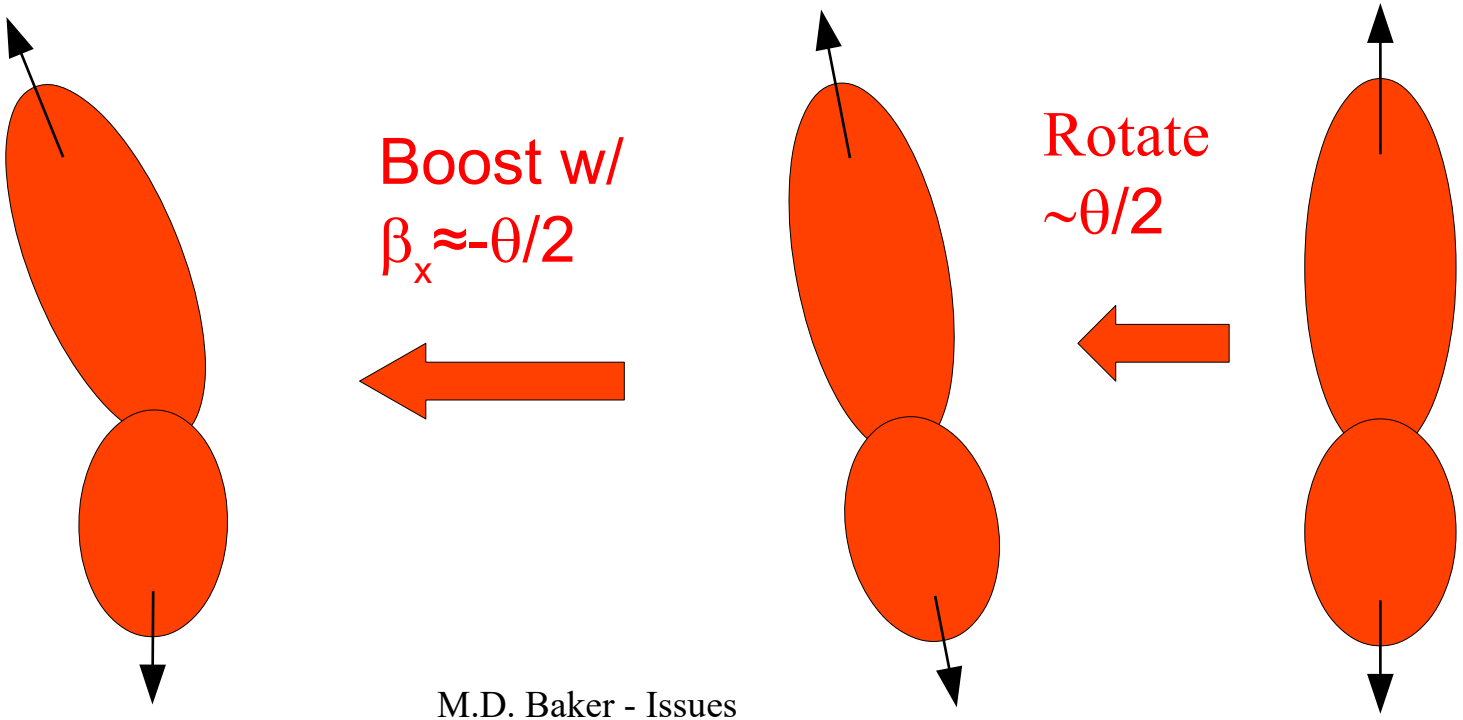
θ=0.0222 Coll. p_e=~~18.00111 GeV~~ Coll. p_A/A=~~109.9837 GeV~~

1ppm variation few ppm variation!

ANY MODEL

OUT:



Crossing angle & angular dispersion

- Simulate in collinear frame
- ROBO to laboratory collider frame
- Note: Formula are a little more complicated than $\beta_x=\theta/2$ and $\theta_{rot}=\theta/2$, but straightforward.
  - Even a bit more complicated when you include angular dispersion in y – but still OK...
- If we approximate collinear p_e and p_A as fixed, then an afterburner will work.
  - Otherwise vary p event by event
  - Need that to simulate beam p distribution anyway...

Pythia issues

- Do I need to set CKIN(1)=0 (vs. 2 default) or is 1 OK? (min sqrts-hat
- PARP(2) must be lowered
- For 5.01 GeV e + fixed target p Pythia yields:
  - Qsquared = 1.00884 * trueQ2
  - X = 0.9225*trueX-0.008*trueX**2
- Some kinematic approximations somewhere?